UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
WATER AND WATERSHEDS

September 30, 2013

Kevin Freeman
Project Coordinator
ARCADIS
695 N. Legacy Ridge Drive, Suite 200
Liberty Lake, WA 99019

Re: Comments Regarding Irrigation Water Management Plan
Draft Data Quality Objectives
Administrative Order on Consent ("Consent Order")
Docket No. SDWA-10-2013-0080
Yakima Valley Dairies, Washington

Dear Mr. Freeman:

The U.S. Environmental Protection Agency, Region 10 ("EPA") has completed its review of the draft data quality objectives ("DQO") for the Irrigation Water Management ("IWM") Plan, which you transmitted to me in an August 30, 2013 email message, and the accompanying figures which were attached to your subsequent September 5, 2013 email message. The Cow Palace was used as an example. Based on our review, EPA has the following comments regarding the draft DQOs and the figures:

General Comments

1. There text must be revised to reflect that waste from the dairy lagoons is also a form of water that is applied to the application fields. The relative, approximate percentages of lagoon wastewater vs. irrigation water that are applied to the fields must be added.

2. The text must be revised to reflect that the soil sensors must be monitored year-round, whether or not a crop is in the field, to detect any that water that may be moving down past the root zone.

3. In the final plan, all terms must be clearly defined in words and mathematically, as appropriate.

4. In the final plan, the decision-making process for deciding whether (and how much) to increase or decrease the amount of irrigation water to be ordered for the following week must be spelled out in incremental detail so that an independent analysis using identical inputs would result in identical conclusions.

5. Sensors must be installed and maintained at the 1 foot, 2 foot, and 3 foot depths at all monitoring locations if the proposed approach is to achieve the objective. Sensors at the 1 and 2 foot depths will provide valuable information about water retention and

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movement through the soil column, which will help unsure an efficient application of water.

6. The text must clearly state that one purpose of the sensors at the 3 foot level is to evaluate the overall effectiveness of the IWM program. It is expected that as time goes on, effective implementation of the IWM soil moisture program will result in fewer saturation events in any of the 3 foot sensors until such events become rare or nonexistent, except perhaps as a result of an unusually heavy rainfall or snowmelt.

7. Any activities involving the application of water onto the fields to counteract the accumulation of salts in the soil must be described in detail in the plan to ensure that the risk to groundwater is minimized.

8. The final plan must state that if new application field "management" SU's are created by configuring the irrigation system to distribute water unevenly to different parts of the field, the new SUs will be reviewed and approved by EPA to ensure that they are adequately monitored by existing soil sensors. Additional soil sensors may be required in new management zones.

9. The final plan must include a section that describes how the IWM plan and the Dairy Facility Application Field Management Plans will complement each other to minimize the potential for nitrate to move from the application fields through the soil column to the drinking water aquifer.

10. In the final plan, the example charts showing the data output of the soil sensors must be revised to spell out all abbreviations. The charts must be clear enough on their face to be understood by an educated lay person without reading additional background materials.

<u>Specific Comments</u>

1. Step 1 – Description of the Problem. The description of the problem must center on the statement that over-application of water to application fields, in excess of the amount required by any crop that is being grown, can migrate past the root zone and transport nitrate to the drinking water aquifer.

2. Step 1 - Conceptual Site Model. The discussion of maximizing crop yield is extraneous to the Conceptual Site Model section, and to the IWM Plan, and must be deleted. The Conceptual Site Model section must provide and describe a diagram that shows a cross section of the first five feet of soil in an application field, showing the "root zone," some plants growing, and water being applied to the crop from an irrigation system and moving through the soil. Provide arrows that show some of the water being taken up by the crop, and some moving downward toward the groundwater. The text must reflect that the main purpose of the work that will be implemented under this plan is the prevention of water and nitrate leaching past the root zone of the plants.

3. Step 2 – Principal Study Question. The IWM plan is an action plan, not a study. Delete the study question and replace it with: "Principle Question: Based on groundwater monitoring sensor data at the 3-foot depth, do irrigation methods rates and/or methods need to be adjusted to minimize water/nitrate migration past the root zone?"

4. Step 3 – Appropriate Sampling and Analysis Methods. Add a bullet at the end of this section that states, "The calculation of water needs and all the calculated values from the above data will be presented in detail in reports submitted to the EPA so that a reader will be able to understand how the results are computed from the data collected or obtained from other sources.

5. Step 4 – Target population. Change the last sentence to, "While it is anticipated that these sensors will provide valuable information regarding soil moisture conditions, they will not be used to automatically shut off the irrigation system during a watering event. However, they will be used to evaluate the overall objective of the IWM soil moisture monitoring program on a weekly basis. The data obtained by the sensors will be downloaded, plotted, and interpreted prior to ordering the water allocation for the following week. The data will also be provided to EPA on a weekly basis electronically as plots for each of the three different zones where sensors are located."

6. Step 5- Population Parameter of Interest.

    a. Change the second sentence to, "Secondarily, additional electronic sensors will be placed at all locations with a 3 foot deep sensor – one within the root zone at 1 foot and another at 2 feet below ground surface. The data will be analyzed weekly using the information from the 1 foot, 2 foot and the deeper (3 foot deep zone) sensors to provide a better understanding and document the water in the soil and its changes over the period of data collection, and to document the long term patterns from the irrigation that occurs."

    b. Delete the sentence, "However, these sensors will not be used to evaluate the overall objective of the IWMP soil moisture monitoring program." Replace it with, "The sensors at the 3 foot depth will be used to evaluate the overall objective of the IWM soil moisture program. The goal is to not experience saturation at any sensors at the 3 foot depth. It is expected that as time goes on, effective implementation of the IMW soil moisture program will result in fewer saturation events in any of the 3 foot sensors until such events become rare or nonexistent, except perhaps as a result of an unusually heavy rainfall or snowmelt."

7. Step 7 – Developing the Plan for Obtaining Data.

    a. Ensure that all SUs are clearly labeled in the Figures.

    b. There are two CP-SU-B locations described. Should one of them be CP-SU-A? Make the appropriate correction.

8. Step 8 – Figures.

   a. It is unclear whether the maps or the description criteria control the exact field locations. Some appear to be off, for example in Figures 3 and 7. Make the appropriate corrections.

   b. Add topographical lines (in a different color such as blue) to the figures so that swales and low spots in fields can be evaluated.

Please revise the DQOs and the report to address these comments, integrate the DQOs into the revised IWM Plan, and provide the revised IWM Plan to EPA by October 30, 2013.

You may contact me at (206) 553-6904, or your legal counsel may contact Jennifer MacDonald at (206) 553-8311, if you have any questions regarding this letter.

Sincerely,

Eric Winiecki
EPA Project Coordinator
Office of Water and Watersheds

Enclosure

cc: Jennifer MacDonald
Rene Fuentes